

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

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Phyllis Reha

Chair
Commissioner
Commissioner
Commissioner
Commissioner

In the Matter of the Application
of Summit Wind, LLC for a Site
Site Permit for the Jeffers Wind Energy
Center 60-Megawatt Large Wind Energy
Conversion System in Cottonwood
County, Minnesota

FINDINGS OF FACT, CONCLUSIONS AND ORDER ISSUING A SITE PERMIT TO SUMMIT WIND, LLC

**EQB DOCKET NO.
96-LWECS-SW**

**PUC DOCKET NO.
E6465/WS-05-1220**

The above-entitled matter came before the Minnesota Public Utilities Commission (MPUC), pursuant to an application by Summit Wind, LLC for a site permit to construct, operate, maintain and manage a 60 (nominal) Megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities near the City of Jeffers in Cottonwood County. Wind Energy Developers, LLC (WED) applied for the permit on behalf of Summit Wind, LLC, a limited liability company. The site permit is to be issued in the name of Summit Wind, LLC.

All of the proposed wind turbines, foundations, transformers, feeder lines and collection lines will be located in Cottonwood County. Summit Wind, LLC will build the project in two phases. Phase I will deliver approximately 10 megawatts of power to the Central Minnesota Municipal Power Agency (CMMPA) under the terms of a Power Purchase Agreement. Phase II is expected to deliver approximately 50 megawatts of power to Xcel Energy under a separate Power Purchase Agreement, which is under negotiation. The energy from the proposed nominal 60 MW project will be delivered to a new switchyard planned adjacent to the Storden Junction Substation with interconnect to the grid at the Storden Junction Substation, owned by Interstate Power & Light Company.

STATEMENT OF ISSUE

Should Summit Wind, LLC, be granted a site permit under Minnesota Statutes section 116C.694 to construct a 60 (nominal) megawatt Large Wind Energy Conversion System (LWECS) in Cottonwood County, Minnesota?

Based upon the record and proceedings created in this proceeding, the Minnesota Public Utilities Commission makes the following:

FINDINGS OF FACT

Background and Procedure

1. On June 20, 2005, Wind Energy Developers, LLC (WED), on behalf of Summit Wind, LLC (Summit), filed an application with the Minnesota Environmental Quality Board for 60 (nominal) megawatts of wind power generating capacity. (Exhibit 1)
2. EQB staff determined that the June 20, 2005, application complied with the application requirements of Minnesota Rules, part 4401.0450. In a memorandum to the EQB chair, dated June 28, 2005, EQB staff recommended that the EQB chair accept the application. (Exhibit 2)
3. On June 28, 2005, the EQB chair accepted the application and notified Summit Wind, LLC that its application for a site permit for the 60 megawatt Jeffers Wind Energy Center and associated facilities was accepted. (Exhibit 3)
4. The legislative authority for Large Wind Energy Conversion Site permits was transferred to the Minnesota Public Utilities Commission from the Minnesota Environmental Quality Board on July 1, 2005, and responsibility for conducting the public review process was assigned to the Minnesota Department of Commerce staff.
5. On July 8, 2005, Summit Wind mailed a Notice of Application Acceptance to Cottonwood County, the City of Jeffers, and the four townships (Storden, Amo, Amboy and Dale) within the site permit boundaries. (Exhibit 4) Notice of Application Acceptance appeared in the *Cottonwood County Citizen*, on July 13, 2005. (Exhibit 5) The applicant pursuant to Minnesota Rules part 4401.0460 Subp 2. placed this ad.
6. On July 21, 2005, Summit Wind provided copies of the accepted application to Cottonwood County, the City of Jeffers, the four townships in the project boundaries and participating landowners. (Exhibit 6)
7. On August 1, 2005, the Minnesota Department of Commerce made available for public review and comments a draft site permit on the MPUC and EQB web page.
8. On August 4, 2005, the Department of Commerce provided notice of a Public Information Meeting, scheduled for August 15, 2005 in Jeffers to receive public comments on the site permit application and draft site permit for the Jeffers Wind Energy Center. This notice was sent to the project distribution list, which included Cottonwood County Commissioners, township representatives, affected landowners, and other interested persons on the wind power distribution lists. (Exhibit 7)

9. On August 1, 2005, the Department of Commerce published in the *EQB Monitor* notice of the August 15, 2005, public information meeting in Jeffers, Minnesota, and the availability of the draft site permit Volume 29, No. 16, August 1, 2005. (Exhibit 8) The published notice contained all of the information required by Minnesota Rules part 4401.0550 subp. 1. DOC also mailed a copy of this notice to all persons on the wind power distribution list. See Finding Number 8. Notice also appeared on the EQB and MPUC web site.
10. The Department of Commerce published notice of the DOC public information meeting and opportunity to comment on the application and draft site permit in the *Cottonwood County Citizen* on August 1 and 3, 2005. (Exhibit 9) The published notice provided: a) location and date of the public information meeting; b) description of the proposed project; c) deadline for public comments on the application and draft site permit (August 31, 2005); d) description of the LWECS site permit review process; and e) identification of the public advisor. The notice published meets the requirements of Minnesota Rules part 4401.0550 subp2.
11. The Department of Commerce Energy Facility Permitting staff held a public information meeting on August 15, 2005, in Jeffers, Minnesota, to receive comments on the site permit application and draft site permit. Approximately 40 people attended the meeting. Representatives from Summit Wind, LLC were also present. DOC staff provided an overview of the LWECS permitting process and responded to questions about the permitting process. Summit Wind representatives responded to questions about the project. Questions were asked about access roads, project timing, location of distribution and feeder lines, electrical and television interference and project decommissioning. No significant issues or concerns were raised about the permitting process, the proposed project, or conditions in the draft site permit at the public meeting. The public comment period on the project closed on August 31, 2005.

The Permittee

12. Summit Wind, LLC is a company formed by 34 area landowners to facilitate development of the area as a wind farm investment. Wind Energy Developers, (WED) based in Chaska, Minnesota, is the developer for this project, and is functioning as the agent of Summit Wind, LLC for the permitting, construction, and operation of the Jeffers Wind Energy Center.

Project Description

13. As proposed, the 60 (nominal) Megawatt Jeffers Wind Energy Center will be built in two phases, with consideration given to further development in the future. The proposed turbine model and specifications may change for Phase II because this part of the project will not be built until 2006.

14. Phase I will consist of four Clipper Windpower 2.5-megawatt (MW) wind turbine generators and an electrical collection system. The turbines will be mounted on 80-meter (264 feet) high freestanding tubular towers. The blades on the Clipper wind turbine are 45.2-meters (149 feet) long. The rotor diameter of each turbine is 93 meters (305) feet, with a rotor swept area of approximately 73,120 square feet. The overall height of the tower, nacelle and blade will be approximately (125.2 meters) 411 feet when one blade is in the vertical position. The electrical collector system will include underground 34.5 kV collection lines and facilities providing step-up transformation.
15. Phase II will consist of 28 Vestas 1.8 MW wind turbine generators, or an equivalent turbine model, possibly using up to 34 1.5 MW wind turbines, and an additional 34.5 KV collection system. The Vestas turbines will be mounted on 78-meter (257 feet) high freestanding tubular towers. The blades on the Vestas wind turbine are 39-meters (129) long. The rotor diameter of each turbine is 80-meters (264 feet), with a rotor swept area of approximately 54,114 square feet. The overall height of the tower, nacelle and blade will be approximately 117 meters (386 feet).
16. The project will also include an underground-automated supervisory control and data acquisition system (SCADA) for communication purposes, unless a wireless system is used. Up to three permanent meteorological towers will also be used as part of the communication system. Other components of the project include a concrete and steel foundation for each tower, pad-mounted step-up transformers, all weather class 5 roads of gravel or similar material, and an underground and overhead electric energy collection system. An operations and maintenance building will be built to house consumables, spare parts, and some control functions.
17. Each turbine is interconnected through an underground electrical collection system at 34.5 kV. The 34.5 kV feeder lines from the project collection system will feed the power to a new switchyard planned adjacent to the Storden Junction Substation with interconnect to the grid at the Storden Junction Substation. Interstate Power & Light Company owns the Storden Junction Substation. The substation steps up the voltage from the 34.5 kV collection system to the transmission system level of 69 kV. The applicant is proposing to place the 34.5 kV feeder lines on public road rights-of-way where possible. Depending on conditions the feeder lines may be either overhead or underground.
18. Each tower will be secured by a concrete foundation that will vary in size depending on the soil conditions. A control panel that houses communication and electronic circuitry is placed in each tower. In addition, a step-up, pad-mounted transformer is necessary for each turbine to collect the power from the turbine and transfer it to a 34.5 kV collection system via underground cables.
19. All wind turbines and the meteorological tower system will be interconnected with fiber optic communication cable that will be installed underground. The communication cables will run back to a central host computer, which will be located either at the Storden Junction Substation or at the operations and maintenance facility where a

supervisory control and data acquisition (SCADA) system will be located. Signals from the transformers at each of the delivery points will also be fed to the central SCADA host computer. The SCADA system will be able to give status indications of the individual wind turbines and the substation and allow for remote control of the wind turbines locally. This computerized supervisory control and data acquisition network will provide detailed operating and performance information for each wind turbine. Summit Wind, LLC will maintain a computer program and database for tracking each wind turbine's maintenance history and energy production. The DOC will have access to the SCADA system.

20. Housed inside the fiberglass nacelle that sits on the top of the tower are the generator, brake system, yaw drive system and other miscellaneous components.

Wind Resource Considerations

21. The Jeffers Wind Energy Center project will be located on what is considered the southeast end of Buffalo Ridge in Cottonwood County. It should be noted that most of Cottonwood County, including the project area, lies on a ridge know as the "*Coteau des Prairies*" ("hill of grasses"). The proposed turbine locations are on relatively high ground, with ground elevations for the Phase I turbines on the order 1,510 feet above mean sea level (M.S.L). The Phase II turbines and turbines from any later phases will be sited in areas with ground elevations greater than 1,450 feet above M.S.L. Buffalo Ridge rises about 200 feet above the surrounding terrain with a general orientation northwest to southeast. Winds perpendicular to the ridge are topographically accelerated as they flow over the ridge. Land use in the Buffalo Ridge area is agricultural with intensive farming and grazing activities and, as a result, there are few trees or structures in the proposed project site to inhibit the wind as it passes over the ridge. The wind resource in the Buffalo Ridge area is well documented by the Wind Resource Analysis Program (WRAP) Report (2002) prepared by the Minnesota Department of Commerce. The WRAP Report presents wind analysis data from monitoring stations across the state of Minnesota.
22. For the Jeffers Wind Energy Center the wind turbines will be sited in clusters or strings along hilltops and ridgelines within the site boundaries. The wind turbines will be sited so as to have good exposure to winds from all directions with emphasis on exposure to the prevailing southerly wind directions. The turbine spacing, according to Summit Wind's application, maximizes use of the available wind and minimizes wake and array losses within the topographical context of the site. The turbine strings are typically oriented west-northwest to east-southeast, which is roughly perpendicular to the prevailing southerly winds. Turbine placement has been designed to provide 3 rotor diameter (RD) spacing in the east-west direction and 5 rotor diameter spacing in the north-south direction, with respect to the predominant energy production directions. Given the prevalence for southerly winds, the spacing is widest in the north-south direction. Greater or lesser spacing between the turbine strings may be used in areas where the terrain dictates the spacing. This is addressed in the permit at III.E.5.

Individual, isolated turbine sites are avoided to minimize interconnection and access costs. Sufficient spacing between the turbines is utilized to minimize wake losses when the winds are blowing parallel to the turbine rows.

23. The net annual energy output for Phase I, using four Clipper Windpower 2.5 MW wind turbines is 34,768-megawatt hours (MWh), or 8,692-MWh per turbine. The Phase II net annual energy output for the 28 Vestas 1.8 MW wind turbines is 172,533 MWh, or 6,162 MWh per turbine. The base energy calculation presented assumes a normal or average wind year. The maximum variation in energy is within +/- 15 percent. Based on the data, one would expect the annual variation in energy at the project site to be within 10 percent of the mean during most years.
24. Most of the land within the 8,320 acre project site is actively farmed. Approximately 90 percent of the land in Cottonwood County is used for agricultural purposes. Corn and soybeans are the dominant crops.
25. The project site as proposed includes 13 sections of land or approximately 8,320 acres. Townships within the site permit boundaries include: Storden, Amo, Amboy and Dale. The land is predominately agricultural, with some scattered wooded areas and wetlands. The proposed wind turbine site layout in the site permit application shows where the proposed facilities, such as towers, roads and the underground electrical lines, could be located. These locations are very preliminary and subject to change. It is estimated that the proposed facilities will result in the permanent disturbance of approximately 16 acres of land, primarily for roads and towers. Up to approximately 60 acres of land will be temporarily disturbed during construction of the wind farm for contractor staging areas, foundation construction, underground power lines, and tower and turbine assembly. Roads are expected to be about 16 feet wide.

Land Rights and Easement Agreements

26. In order to build a wind plant, a developer needs to secure site leases and easement option agreements to ensure access to the site for construction and operation of a proposed project. These lease or easement agreements also prohibit landowners from any activities that might interfere with the execution of the proposed project.
27. Summit Wind, LLC has obtained lease and easement option agreements and/or rights to such agreements with participating landowners for land within the project site boundary necessary for installation of the components of the wind farm. These rights and easements will be available to Summit Wind, LLC for the Jeffers Wind Energy Center project. Two parcels of land in Storden Township in sections 25 and 27 are excluded from the site, but the owners of those parcels may decide to become participants.

Written Comments and Letters Received by August 31, 2005

28. By the close of the comment period on August 31, 2005, one comment letter on the proposed Jeffers Wind Energy Center project was received.

29. The comment letter was from Joel Schittone of RMT, an Environmental Consultant representing Summit Wind, LLC and Wind Energy Developers, LLC, dated August 30, 2005. The comment letter requested several minor language clarification changes in the site permit. These language clarification changes have been incorporated into the site permit.

Site Criteria

30. Minnesota Rules chapter 4401 applies to the siting of Large Wind Energy Conversion Systems. The rules require applicants to provide a substantial amount of information to allow the MPUC to determine the potential environmental and human impacts of the proposed project and whether the project is compatible with environmental preservation, sustainable development, and the efficient use of resources. Minn. Rules parts 4401.0450 through 4401.0600. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

Human Settlement, Public Health and Safety

31. The site is in an area of low population density, with little residential, commercial or industrial development on or near the site, except for the city of Jeffers. As a result, the impact of the proposed LWECS on human settlement, public health and safety will be minimal. The site permit, at part III. C. has conditions for setbacks from residences and roads. The proposed wind turbine layout meets or exceeds those requirements. The proposed project is not expected to affect any water wells (used, unused or unsealed) or any rural water system that services the area.
32. There will be no displacement of existing residences or structures in siting the wind turbines and related facilities.
33. The project will comply with the Federal Aviation Administration requirements with respect to lighting. See site permit condition III.E.4.
34. Summit Wind, LLC will provide security during construction and operation of the project, including fencing, warning signs, and locks on equipment and facilities. Summit Wind, LLC will also provide landowners and interested persons with safety information about the project and its facilities. See site permit condition III.B.15.
35. In winter months ice may accumulate on the wind turbine blades when the turbines are stopped or operating very slowly. Furthermore, the anemometer may ice up at the same time, causing the turbine to shut down during any icing event. As weather conditions change, any ice will normally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades' smooth surface. Although turbine icing is an infrequent event, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines or in the immediate proximity during the winter months.

36. Each turbine will be clearly labeled to identify each unit and a map of the site with the labeling system will be provided to local authorities as part of the fire protection plan. See site permit condition III B.16.

Noise

37. Wind turbines do generate noise. According to sound pressure level tests and estimations provided by Summit Wind, LLC in its application for a site permit, the sound pressure level for the turbines is expected to be lower than the Pollution Control Agency noise standard of 50 dBA measured at the closest residence. See Minn. Rules part 7030.0040. The Phase I, Clipper wind turbines will need to be located at least 632 feet and the Phase II, Vestas wind turbines will need to be located at least 526 feet from the nearest occupied residence to meet PCA noise standards.

Visual Values

38. The placement of up to 38 turbines will affect the appearance of the area. The wind turbines will be mounted on tubular towers that are up to 265 feet tall. The rotor blades will have a diameter of up to 305 feet. The turbine towers and rotor blades will be prominent features on the landscape. There will be intermittent, expansive views of the turbines to passing motorists on state highways 30 and 71. Motorists and drivers on local township and county roads will travel within 300 feet of some turbines.
39. The visual impact of the wind turbines will be reduced by the use of a neutral paint color. The only lights will be those required by the Federal Aviation Administration. All eleven site permits issued by the EQB have required the use of tubular towers; therefore, the turbine towers will be uniform in appearance. The turbine towers will be similar to those used on the Chanarambie and Moraine wind projects in the counties of Pipestone and Murray. Blades used in the proposed project will be white or neutral in color. The wind turbines in this project, while prominent on the landscape are not out of place with the surrounding area. The project site will retain its rural character. The turbines and associated facilities necessary to harvest the wind for energy are consistent with existing land use and agricultural practices.
40. From one perspective, the proposed project might be perceived as a visual intrusion on the natural aesthetic value on the landscape, characterized by up to 38 tubular steel structures approximately 265 feet high, standing on formerly undisturbed ridgelines, with 149-foot blades, for an overall height of 411 feet when one blade is in the vertical position. Wind plants have their own aesthetic quality, distinguishing them from other non-agricultural uses. The existing wind plants on Buffalo Ridge have altered the landscape in the area from agricultural to wind plant/agricultural. Because wind generation development is likely to continue on the ridge, this visual presence will continue to increase the size of the wind plant/farm footprint as the turbines harvest the wind resources of Buffalo Ridge and other areas for energy. To date the presence of the wind turbines on Buffalo Ridge area has been well accepted by the people who live and work in the area.

41. Several other measures will also be taken to minimize visual intrusion such as: low profile access roads, project access roads will avoid cuts and fill, the areas affected by construction will be restored after construction is completed, turbines will not be illuminated unless required by FAA regulations, and the turbine rotor size will require increased turbine spacing to minimize wake loss, therefore the turbines will be spaced further from one another than in other projects on Buffalo Ridge. The visual scale will be similar.

Recreational Resources

42. Recreational opportunities in Cottonwood County include hunting, fishing, snowmobiling, camping and hiking. Hunting is permitted in designated Minnesota Department of Natural Resources Wildlife Management Areas (WMAs), unless otherwise posted.
43. There are two Waterfowl Protection Areas (WPAs) and one Wildlife Management Area (WMA) to the south and west of the site. WPAs are federally owned and managed and are a combination of wetland and grasslands managed for breeding and migrating avian species. WMAs are owned by the State of Minnesota and managed by the Department of Natural Resources, and are managed to provide wildlife habitat, improve wildlife production and provide public hunting and trapping opportunities. These MDNR lands were acquired and developed primarily with hunting license fees. WMAs are closed to all-terrain vehicles and horses because of detrimental effects on wildlife habitat.
44. The turbines will be noticeable to persons using the WPAs and WMAs. Turbines will not be located in WPAs or WMAs. Turbine operations are not expected to affect the natural areas in any material way and no adverse impact on wildlife management areas or practices is expected.

Infrastructure

45. The proposed wind farm is expected to have a minimal effect on the existing infrastructure. The proposed project will use underground cables for the collector lines on private property within the wind farm. The feeder lines associated with the project are currently planned to be underground. Any aboveground feeder lines, if used, would be wood-pole, 34.5 kV typical of wind project feeder lines in the Buffalo Ridge area. The feeder lines will deliver the energy from the Jeffers Wind Energy Center to the Storden Junction Switchyard and Substation located in section 28 of Storden Township. Placement of collector and feeder lines is addressed in the site permit at III.E.7 and 8.
46. The project will require the use of public roads to deliver construction supplies and materials to the work site. Site permit condition III.B.8. addresses this topic. Construction of the project requires the addition of several miles of access roads that will be located on private property. The access roads will be located along the wind turbine strings, fence lines, and field edges to minimize disturbance to agricultural activities. The typical access road will be 16 to 20 feet in width and covered in Class 5 gravel (or similar

material). The access roads will be low profile roads to allow for the movement of agricultural equipment. The site permit at III.B. 8 (b) addresses this topic. During operation and maintenance of the wind plant, operation and maintenance crews, while inspecting and servicing the wind turbines, will use the access roads. Periodic grading or other methods will be used as necessary to maintain road integrity. The Permittee may do this work or contract it out.

47. If access roads must be installed across streams or drainage ways, the Permittee in consultation with the Minnesota Department of Natural Resources will design, shape and locate the road so as not to alter the original water flow or drainage patterns. Any work required below the ordinary high water line, such as road crossings or culvert installation, will require a permit from the Minnesota Department of Natural Resources.
48. The proposed wind farm is not expected to affect water supplies, railroads, telecommunication facilities and radio reception. The presence or operation of the wind plant could potentially impact the quality of television reception in the area. Previous work on television reception issues indicates that in some cases new antennas or relocation of existing antennas can restore television signal strength reception. Summit Wind, LLC will address the concerns of residents in the area of the project site before and after the project construction to document and mitigate any television reception impacts that might occur. This is addressed in the site permit at III.D.3.
49. Construction, operation, and maintenance of the proposed wind plant will comply with all of the required federal and state permit requirements.

Community Benefits

50. The project will provide local tax revenues from a production tax on the wind turbines. No significant adverse impact on public services is expected. Wear and tear on roads will occur as a result of the transport of heavy equipment and other materials. The site permit at III.B.8. addresses road damages.
51. To the extent that local workers and local contractors are capable, qualified, and available, Summit Wind, LLC will seek to hire them to construct the proposed project. The hiring of local people will expand employment opportunities in this area of the state and keep money in the local economy. Once constructed, the project may be staffed with two to three full-time site technicians and a wind plant supervisor.

Effects on Land-Based Economies

52. The wind turbines and access roads will be located so that the most productive farmland will be left as intact as possible. However, the project will displace approximately 16 acres of agricultural land. The site permit at III.B. 2, 3, 4, 5, 6, 7, 8(c), 9, and 10 addresses mitigation measures for agricultural lands. The proposed project does not affect any sand or gravel operations.

Archaeological and Historical Resources

53. A review of the Minnesota State Historic Preservation Office (SHPO) computer database indicates that no recorded archaeological sites are within the study area or project site. The geographical prominence of Buffalo Ridge made it a significant location for Native Americans, especially the Dakota Indians.
54. No Phase I archaeology survey is recommended for Phase I of the Jeffers Wind Energy Center. A Phase I archaeology survey is recommended for Phase II. A Phase I archaeology survey consists of the following tasks: consultation, documentation, and identification of areas considered to have high archaeological potential and to identify the presence of any previously unidentified precontact archaeological sites. The Phase I archaeology survey will cover proposed turbine locations, access roads, junction boxes and areas of construction impact for the transmission line to document any previously unrecorded archaeological sites within the project site. See site permit at III. D.2.
55. If any archaeological sites are found during the Phase I survey, their integrity and significance should be addressed in terms of the site's potential eligibility for placement on the National Register of Historic Places (NRHP). If such sites are found to be eligible for the NRHP, appropriate mitigative measures will need to be developed in consultation with the Minnesota State Historic Preservation Officer (SHPO), the State Archaeologist, and American Indian communities. The site permit also requires the Permittee to stop work and notify the Minnesota Historical Society and MPUC if any unrecorded cultural resources are found during construction.

Air and Water Emissions

56. No harmful air or water emissions are expected from the construction and operation of the LWECS.

Animals and Wildlife

57. Neither construction nor operation of the project is expected to impact wildlife. Based on studies of existing wind power projects in the United States and Europe, the only impact of concern to wildlife would primarily be to avian and bat populations. The final report on avian monitoring studies at Buffalo Ridge, Minnesota "*Final Report-Avian Monitoring Studies at the Buffalo Ridge, Minnesota Resource Area: Results of a 4-Year Study*" (September 2000) identified the following impacts:
 - a) Following construction of the wind turbines, there is a reduction in the use of the area within 100 meters of the turbines by seven of 22 species of grassland breeding birds. It was hypothesized that lower avian use may be associated with avoidance of turbine noise, maintenance activities, and less available habitat. The researchers stated "on a large scale basis, reduced use by birds associated with wind power development appears to be relatively minor and would not likely have any population consequences on a regional level."(p. 44)

- b) Avian mortality appears to be low on Buffalo Ridge, compared to other wind facilities in the United States, and is primarily related to nocturnal migrants. Resident bird mortality is very low and involves common species. The researchers stated that “based on the estimated number of birds that migrate through Buffalo Ridge each year, the number of wind plant related avian fatalities at Buffalo Ridge is likely inconsequential from a population standpoint.” (p. iv)

- 58. Bat mortality was also studied at Buffalo Ridge, instigated by bat collision victims found during the avian monitoring studies. The bat study was conducted in 2001 and 2002. (*“Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area,”* November 2003). The overall conclusion is that bat activity at turbines and the numbers of bat fatalities do not share a statistical relationship. Bat collisions were found to be very rare, given the amount of bat activity documented at the turbines. Most fatalities involved migrating bats, a wind-plant related mortality “is possibly not sufficient to cause significant, large-scale population declines.” (p. 61)
- 59. Mitigation measures are also prescribed in the site permit and include but are not limited to: a) a pre-construction inventory of existing biological resources, native prairie, state listed and threatened species and wetlands in the project area; b) turbines and associated facilities will not be constructed in wildlife management areas, recreation and state and scientific natural areas; c) trees and shrubs that are important to the wildlife present in the area will not be disturbed; d) sound water and soil conservation practices will be implemented during construction and operation of the project to protect topsoil and adjacent resources and to minimize soil erosion. This also applies to any work in proximity to watercourses.

Vegetation

- 60. No public waters, wetlands or forested land are expected to be affected by the project. No groves of trees or shelterbelts will need to be removed to construct and operate the system. Native prairie will also be avoided. If native prairie cannot be avoided, the site permit, at III. C.6. provides for preparation of a prairie protection and management plan.

Soils

- 61. Construction of the wind turbines and access roads increases the potential for erosion during construction and converts prime farmland to industrial use. The site permit at III. B. 9. requires a soil erosion and sediment control plan. The project will also require a storm water run-off permit from the Minnesota Pollution Control Agency.

Surface Water and Wetlands

- 62. No towers, access roads or utility lines will be located in surface water or wetlands. See site permit at III.C.5.

Future Development and Expansion

63. Other wind projects have been installed throughout the Buffalo Ridge area. Current information suggests the Ridge's windy areas are large enough to accommodate more wind facilities. In the future, turbines used at the Ridge likely will consist of several types and sizes supplied by different vendors and installed at different times.
64. While large-scale projects have occurred elsewhere (California, Iowa and Texas), little systematic study of the cumulative impact has occurred. Research on the total impact of many different projects in one area has not occurred. DOC staff will continue to monitor for impacts related to wind energy development.
65. The MPUC anticipates more site permit applications under Minnesota Statutes section 116C.694 (a). The MPUC is responsible for the siting of LWECS "in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources." Minnesota Statutes section 116C.693.
66. Minnesota Statutes section 116C.57, subd. 4 requires consideration of design options that might minimize adverse environmental impacts. By using larger turbines, fewer turbines are required, reducing siting needs for turbines and related facilities. Turbines must also be designed to minimize noise and aesthetic impacts. Buffers between strings of turbines are designed to protect the turbines' production potential. The site permit also provides for buffers between adjacent wind generation projects to protect production potential. See site permit at III.C.1.
67. The location and spacing of the turbines are critical to the issues of orderly development and the efficient use of wind resources. Turbines are likely to be located in the best winds, and the spacing dictates, among other factors, how much land area the project occupies. There is strong public support for orderly development.
68. One efficiency issue is the loss of wind in the wake of turbines. When wind is converted to rotational energy by the blades of a wind turbine, energy is extracted from the wind. Consequently, the wind flow behind the turbine is not as fast and is more turbulent than the free-flowing wind. This condition persists for some distance behind the turbine as normal wind flow is gradually restored. If a turbine is spaced too close downwind from another, it produces less energy and is less cost-effective. This is the wake loss effect. If the spacing is too far, wind resources are wasted and the projects' footprint on the land is unnecessarily large.
69. For this project, turbine spacing maximizes use of the available wind resources and minimizes wake and array losses within the topographical context of the site. Site topography and wind resources did not lead to a layout involving long strips of turbines running parallel to each other and perpendicular to the prevailing wind. Instead, the site uses shorter strings. The objective was to capture the most net energy possible from the best available wind resource. Allowing for setback from roads and residences and avoiding native prairie and other sensitive areas, Summit Wind, LLC arrived at an

average turbine spacing of about 3 rotor diameter spacing in the east-west direction and 5 rotor diameter spacing in the north-south direction, with respect to the predominant energy production directions. Given the prevalence for southerly winds, the spacing between turbines is greatest in the north-south direction for wind projects in Minnesota, particularly on Buffalo Ridge. Summit's wake investigation shows that the estimated array losses for the proposed Jeffers Wind Energy Center will be around four percent for the Phase I turbines, which are somewhat isolated from the Phase II turbines. Wake losses for the Phase II turbines were assumed to average five percent.

70. Other factors that lead to discounts were assumed to be identical for all arrays and include electrical losses (2.0%); turbine availability (2 to 5% dependent on conditions and turbine vendor); array losses (4 to 5%); icing (2%); and topography adjustments (3%). Other miscellaneous losses may include high wind hysteresis, blade soiling, and cold weather shutdown. Total losses are calculated at 13 to 15 percent.

Maintenance

71. Maintenance of the turbines will be on a scheduled, rotating basis with one or two units normally off for maintenance each day, if necessary. Maintenance on the interconnection points will be scheduled for low wind periods and coordinated with the Central Minnesota Municipal Power Agency and Xcel Energy. The Jeffers Wind Energy Center may be staffed by two to three full time site technicians and a wind plant supervisor.

Decommissioning and Restoration

72. The estimated decommissioning cost for the Summit Wind, LLC (Jeffers Winds Energy Center) Wind Power Plant is \$500,000 (2005 dollars). Decommissioning activities will include (1) removal of all turbines and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations to a depth of three feet below grade; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible. The Permit requires the Permittee to submit a Decommissioning Plan to the MPUC that describes how the Permittee will ensure that the resources are available to pay for decommissioning the project at the appropriate time. Decommissioning funds will be set aside as specific budget item. See Exhibit 1, page 11-1.

Site Permit Conditions

73. Nearly all of the conditions contained in this site permit were established as part of the site permit proceedings of other wind turbine projects permitted by the Minnesota Environmental Quality Board. No significant comments were received concerning the requirements in the draft site permit distributed for comment on August 1, 2005. Minor changes that provide for clarifications of the draft site permit conditions have been made.

74. The site permit contains conditions that apply to site preparation, construction, cleanup, restoration, operation, maintenance, abandonment, decommissioning and all other aspects of the project.

Based on the foregoing findings, the Minnesota Public Utilities Commission makes the following:

CONCLUSIONS OF LAW

1. Any of the foregoing findings, which more properly should be designated as conclusions, are hereby adopted as such.
2. The Minnesota Public Utilities Commission, effective July 1, 2005, has jurisdiction under Minnesota Statutes section 116C.694 over the site permit applied for by Summit Wind, LLC.
3. The Summit Wind, LLC application for a site permit was properly filed and noticed as required by Minnesota Statutes section 116C.694 and Minnesota Rules parts 4410.0460, subp. 2 and 4401.0550, subp. 2.
4. The Minnesota Public Utilities Commission has afforded all interested persons an opportunity to participate in the development of the site permit and has complied with all applicable procedural requirements of Minnesota Statutes section 116C.694 and Minnesota Rules Chapter 4401.
5. No objections were filed with the Minnesota Public Utilities Commission by any governmental unit, affected landowner or any other interested person during the 30-day comment period and no public hearing was requested or is required.
6. The Minnesota Public Utilities Commission, effective July 1, 2005, is now the agency directed to carry out the legislative mandate to site LWECS in an orderly manner compatible with environmental preservation, sustainable development and the efficient use of resources. The proposed Jeffers Wind Energy Center LWECS project will not create significant human or environmental impacts and is compatible with environmental preservation, sustainable development, and the efficient use of resources.
7. The Minnesota Public Utilities Commission has the authority under Minnesota Statutes section 116C.694 to establish conditions in site permits relating to site layout, construction and operation and maintenance of an LWECS. The conditions contained in the site permit issued to Summit Wind, LLC are appropriate and necessary and within the Minnesota Public Utilities Commission's authority.

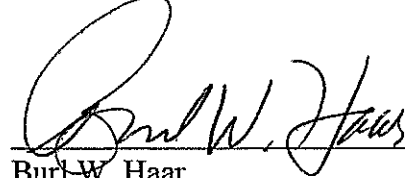
Based on the foregoing Findings of Fact and Conclusions of Law, the Minnesota Public Utilities Commission issues the following:

ORDER

The Minnesota Public Utilities Commission hereby issues a site permit to Summit Wind, LLC in the form attached hereto. The site permit authorizes Summit Wind, LLC to construct and operate a 60 (nominal)-megawatt large wind energy conversion system in Cottonwood County in accordance with the conditions contained in the site permit for EQB Docket No. 05-96-LWECS-SW and PUC Docket No. E6465/WS-05-1220.

Approved and adopted this 22nd day of September 2005.

BY ORDER OF THE COMMISSION

A handwritten signature in black ink, appearing to read "Burl W. Haar", is written over a horizontal line.

Burl W. Haar
Executive Secretary

(S E A L)

This document can be made available in alternative formats (i.e., large print or audio tape) by calling 651-297-4596 (Voice), 651-297-1200 (TTY) or 1-800-627-3529 (TTY relay service).